BROADCAST tools INC

Installation and Operation Manual

SS 2.1/Terminal III
Switcher/Router

Firmware Version 3.4

Manual Revised 07/06/11

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INTRODUCTION

Thank you for your purchase of a Broadcast Tools® SS 2.1/Terminal III Stereo Audio Switcher/Router (referred to as the SS 2.1/Term III throughout this manual). We're confident that this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the Broadcast Tools® SS 2.1/Term III.

SAFETY INFORMATION

Only qualified personnel should install Broadcast Tools® products. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

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THANK YOU FOR CHOOSING BROADCAST TOOLS® BRAND PRODUCTS!

Assembled in the USA, by American Workers

CAUTION!

Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.

NOTE:

This manual should be read thoroughly before installation and operation.

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PRODUCT DESCRIPTION

The SS 2.1/Term III passively switches or routes a variety of electrical signals to a destination. The SS 2.1/Term III selects any one of 2 stereo inputs to a single stereo output. The SS 2.1/Term III provides PASSIVE switching through gold contact relays. The passive switching means that the unit can route a signal in either direction (any one of 2 stereo inputs to a single destination, or a single source to any one of 2 destinations). Due to the passive nature of the switching, any input level and impedance can be used. Inputs may be balanced or unbalanced, while output levels, impedance, distortion, noise and balancing will match that of the selected input. In addition to their normal use with audio signals, the unit can also be used to switch digital signals and telephone lines.

FEATURES

- Operation by front panel switches and LED indicators, contact closures, 5-volt TTL/CMOS logic levels and/or the multi-drop RS-232 serial port.
- Removable screw terminals (Euro) are provided for audio and remote control connections.
- Audio switching via sealed relays utilizing 2-form-C bifurcated-crossbar silver alloy with gold overlay contacts.
- Microprocessor control with non-volatile memory.
- The Power-Up feature allows the user to select which one source is active at power up, including the last source selected.
- Three logic-switching modes.
- The ENABLE switch provides a safety lock to the front panel selection switches.
- The audio MUTE switch allows the user to turn off the audio output when activated.
- Source number one is configured by default to route audio to the output in the case of loss of power to the unit.
- Non-selected sources are terminated with 10K Ω, load resistors.
- Relays provided for remote status.
- Desktop, wall mount or rack mount three units on the RA-1, 1-RU rack shelf.

APPLICATIONS

EAS audio switching, any type of stereo, monaural, composite audio, AES/EBU, ISDN, RS-232/422/485, telephone lines switching, multiple station program on-hold and/or PA switching.

FRONT PANEL DESCRIPTION

Source and Mute Switches:

Each switch represents an input to be routed to the switcher's output. The switches are highly reliable switches, which will give the user years of dependable service. Each switch has an associated LED indicator, which will illuminate when that particular source is routed to the output. When a source is selected, the previous source will be deselected, (interlock). The enable switch (when enabled) requires the user to hold this switch closed while selecting any of the other front panel switches. The front panel power LED illuminates when power is applied to the unit.

REAR PANEL DESCRIPTION

Power:

Connect the 2.1mm barrel type power connector into the unit and the 9 vac, 500-ma wall transformer into a 120 Vac 50-60 Hz power source. (CE, 220 Vac 50-60 Hz wall transformer OPTIONAL)

Audio and Remote Connectors:

The rear panel contains all the inputs, outputs and remote control interfacing connectors. All audio I/O and remote control connections are through pluggable screw terminals with mating connectors. The multi-drop serial port is equipped with a modular RJ-11 jack.

INSTALLATION GUIDELINES

Dip Switch setup:

Follow the tables below for options:

Unit ID	**SW5-1**	**SW5-2**
ID 0 *	OFF	OFF
ID 1	ON	OFF
ID 2	OFF	ON
ID 3	ON	ON

Baud Rate	**SW5-3**	**SW5-4**
2400	ON	OFF
9600 *	OFF	OFF
19200	OFF	ON
38400	ON	ON

Power Up	**SW5-5**
User selected	ON
Last source selected *	OFF

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Note: To select an input at power-up with SW5-5 ON, hold down the push-button for the desired input channel or mute until the front panel LED's flash.

Operation	SW5-6	SW5-7
Normal *	OFF	OFF
Sustained	ON	OFF
EAS switcher	OFF	ON
(SAGE/ENDEC, MSRP Clone, Serial operation)		
Toggle	ON	ON

- Normal operation: Pulse 1-IN to select input 1, Pulse IN-2 to select input 2 or pulse the "M-IN" (mute) pin to turn off both channels.
- Sustained operation: Hold IN-2 low to select input 2.
- Toggle operation: Alternately pulse 1-IN to select between the two input channels.

Note: After changing any dipswitch, please repower the unit.

*** Denotes factory setting.**

It is recommended that all cables connected to the SS 2.1/Term III be looped through ferrite cores to suppress RF. Surge protection with RF filtering such as the Tripp Lite "ISOBAR 4" is also suggested for the power transformer. The purchase of an inexpensive uninterruptible power supply (UPS) will provide back up in case of power outages.

Installation of the SS 2.1/Term III consists of six steps:

1. Inspection.
2. Removal of the source termination resistors, if applicable.
3. Bench test.
4. Mount the unit on a desktop, wall or rack shelf (RA-1).
5. Connect your equipment to the unit.
6. Serial operation, if applicable.

CAUTION!

Installation of the SS 2.1 Term III in high RF environments should be performed with care. Shielded cable is suggested for all control, audio inputs and outputs. All shields should be tied to the "CHASSIS GROUND" terminal. The station ground should be connected to the chassis ground screw (CH1) located behind J5 as viewed from the rear. For lightning protection devices, check out www.polyphaser.com and www.itwlinx.com.

STEP 1: INSPECTION

Please examine your SS 2.1/Term III carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package should contain the SS 2.1/Term III, 9 vac@500-ma wall power transformer, manual, reversed modular cable and "S9" 9-pin female D-Sub adapter.

STEP 2: SOURCE TERMINATION RESISTOR REMOVAL

Input sources that are not selected are terminated with a 10K Ω load (1/4 watt maximum). If you do not want this load applied across the deselected sources, it may be removed from each channel. Each channel has a pair of resistors.

EXAMPLE: Channel 1, relays K1 A&B switches the signal; R1 & R2 are the 10K Ω load resistors. As delivered, all channels are configured with these resistors installed. To remove the load resistors from a channel, locate via the schematic the proper resistors for that channel, cut its leads and discard the resistors.

STEP 3: BENCH TEST

Place each unit on a workspace and connect power to the unit. Check to see if the power LED is lit. Connect an audio source to stereo input one and a monitoring device to the output. Select channel one and verify that audio is present. Repeat the process until each channel's operation has been verified. This would also be a good time to set up the desired switch or jumper options.

STEP 4: MOUNTING

Mount the unit on a rack shelf, such as the Broadcast Tools RA-1, allowing adequate airflow for cooling. The RA-1 is furnished with filler panels to cover open spaces.

STEP 5: CONNECT YOUR EQUIPMENT

The SS 2.1/Term III interfaces to your equipment (sources, loads and remote control) through removable screw terminals. Follow the silk-screened legends for the desired connections on the rear panel of the chassis. Remove the connector and use a small screwdriver to loosen each screw terminal, insert the stripped wire (18 to 26 gauge wire), tighten the screw and reinsert the connector. Refer to the remote control connector-wiring chart on page 8.

TB1 –>TB3 **Typical I/O connector**

I/O – Left	I/O + Left	Gnd	I/O – Right	I/O + Right

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STEP 6: SERIAL OPERATION

Connecting the RS-232 serial port of the SS 2.1/Term III is accomplished by using the supplied reversed modular cable and 9-pin "S9" female D-sub adapter between the SS 2.1/Term III and controlling PC. Select the desired address for each unit. Never duplicate addresses. The default protocol is as follows: 9600, N, 8, 1 (other baud rates are user selectable).

To select a channel, send the following string: *ui

Where the < * > Denotes start of string character.
< u > Unit ID (address, 0 through 3).
< i > Input channel (1, 2 or M (MUTE).

Example: *02 This string would turn on channel 2.
*0M This string would MUTE the switcher's output.
No serial status is provided.

Apply power to the SS 2.1/Term III via the wall transformer.

The SS 2.1/Term III is now ready to be operated.

Remote Control Wiring:

Control:
The front panel switches are brought out through the rear panel remote control connector, providing a means of controlling the SS 2.1/Term III from a remote point. These digital inputs may be a momentary or sustained action, compatible with 5 volts CMOS/TTL logic, open collector or contact closures to ground. The inputs are pulled high. For wiring information, refer to the grid below.

Relays:
Relay contacts are supplied through the remote control connector as both individual dry and wet relay contacts. K3, the SPDT relay is associated with input channel one. K4 is associated with input channel two and provides SPDT dry contacts and selectable (JP3) N.O. or N.C. contacts common to the (+) positive 12vdc(400 ma, MAX) power supply. This provides a simple way to control external devices such as RF or power relays. K5 is associated with the mute function and is selectable (JP4) between the N.O. or N.C. contacts common to ground. For wiring information, refer to the grid below and/or the schematic in the rear of this manual.

TB 4		**Relay Outputs**		**Top Row**	
K3 N.O.	K3 Common	K3 N.C.	K4 N.O.	K4 Common	K4 N.C.
1-IN	2-IN	M-IN (Mute)	GND	GXK5	+XK4
		Inputs & Relay Outputs		**Bottom Row**	

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Jumpers:

JP2: Installed = Front panel enable switch defeated
Removed = Front panel ENABLE switch active. This switch must be held closed to operate any of the other front panel switches. **NOTE:** This switch is NOT associated with any of the remote control functions.

JP3: NO = Brings the N.O. contact for K4 out to the remote control terminal.
NC = Brings the N.C. contact for K4 out to the remote control terminal.
Note: This terminal is labeled +XK4

JP4: NO = Brings the N.O. contact for K5 out to the remote control terminal.
NC = Brings the N.C. contact for K5 out to the remote control terminal.

Note: This terminal is labeled GXK5

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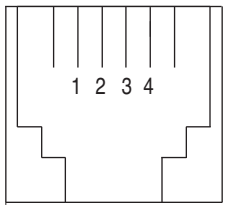
* SAGE ENDEC INSTALLATION GUIDELINES

The pin out of the adapter is shown below.

RJ-11 Adapter Pin	DB-9 D-Sub	SS 2.1 Term III (Point of view)
4	3	RS-232 Receive
3	2	RS-232 Transmit
2	5	Ground



Modular Jack Pin Numbers

Dip Switch Setup: Follow the tables below for setup options:

Unit ID:	**SW5-1**	**SW5-2**
ID 0 *	OFF	OFF
ID 1	ON	OFF
ID 2	OFF	ON
ID 3	ON	ON

Station ID:	**SW5-3**	**SW5-4**
2	ON	OFF
1 *	OFF	OFF
3	OFF	ON
4	ON	ON

Operation:	**SW5-6**	**SW5-7**
Normal *	OFF	OFF
Sustained	ON	OFF
EAS switcher	OFF	ON (SAGE/ENDEC, MSRP Clone, 1200 baud serial)
Toggle	ON	ON

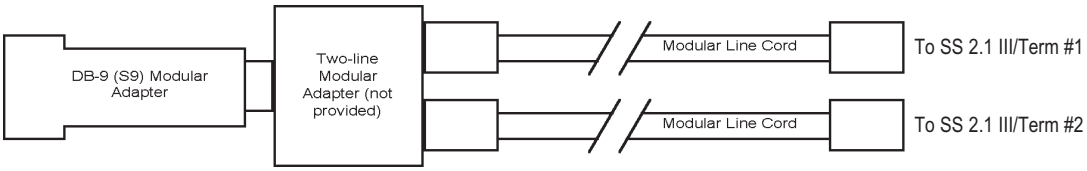
Note: After changing any dipswitch, please repower the unit. * Denotes factory setting.

Connecting a single SS 2.1 III/Term to the Sage "Endec" serial port:

Attach the supplied "S9" DB-9 female adapter to the Sage serial port. Connect the module cable to the adapter and the other end to the RJ11 on the SS 2.1 III/Term. Configure the above dip switch SW5 for the desired operation.

Connecting two or more SS 2.1 III/Term's to the SAGE "Endec" Serial Port:

Multiple SS 2.1 III/Term may be cascaded serially to operate from the same serial port. The first step is to assign ID's to each SS 2.1 III/Term. One suggestion is to assign ID1 to the first SS 2.1 III/Term and ID2 to the second switcher. The second step is to assign a station ID to each switcher. The third step is to parallel the serial ports of the SS 2.1 III/Term's. Plug the male end of the duplex modular adapter into the supplied female "S9", DB-9 to RJ-11 adapter, then attach the supplied reversed modular line cords into each of the duplex modular adapter receptacles (Radio Shack Cat No. 279-0357) and the other ends into each of the SS 2.1 III/Term modular receptacles. See the diagram below. NOTE: Three or more SS 2.1 III/Term's may be daisy chained by using the above description and a Radio Shack Cat No. 279-0410, 5-jack modular adapter.


DB-9 (S9) Modular Adapter
Two-line Modular Adapter (not provided)
Modular Line Cord
To SS 2.1 III/Term #1
Modular Line Cord
To SS 2.1 III/Term #2

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SPECIFICATIONS

Inputs/Outputs:	Any input level and impedance can be used. Inputs may be balanced or unbalanced. Output levels, impedance, distortion, noise and balancing will match that of the selected input.
Switching Method:	Passive. Sealed relays utilizing 2-form-C bifurcated-crossbar silver alloy with gold overlay contacts.
Logic:	Flash microprocessor with non-volatile memory.
Operation Control:	Front Panel – Momentary switches. Remote – Momentary or sustained, compatible with 5 volts CMOS/TTL logic, open collector or contact closures to ground. Serial – Multi-drop RS-232, Receive only, 1200 or 2400, 9600, 19200, 38400 8, N, 1.
Status:	Front Panel – LED Indicators. Remote – SPDT & SPST relays. 1-amp 30 vdc. Refer to schematic for connection details.
Interfacing:	Audio & remote control – Rear panel pluggable screw terminals. Mating connectors supplied. RS-232 – (RJ-11) Reversed modular cable/female “S9” 9-pin D-Sub adapter supplied.
Power Requirements:	9 Vac, 500 ma. 120 Vac 50-60 Hz transformer. Supplied. (CE 240 Vac 50-60 Hz optional)
Physical Dimensions:	5.65” x 6.50” x 1.55” (WDH)
Weight:	2.0 lb.
Shipping Weight:	3.0 lb.
Options:	RA-1 rack shelf, holds three units (1-RU) / Filler panels supplied.

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LIMITED WARRANTY

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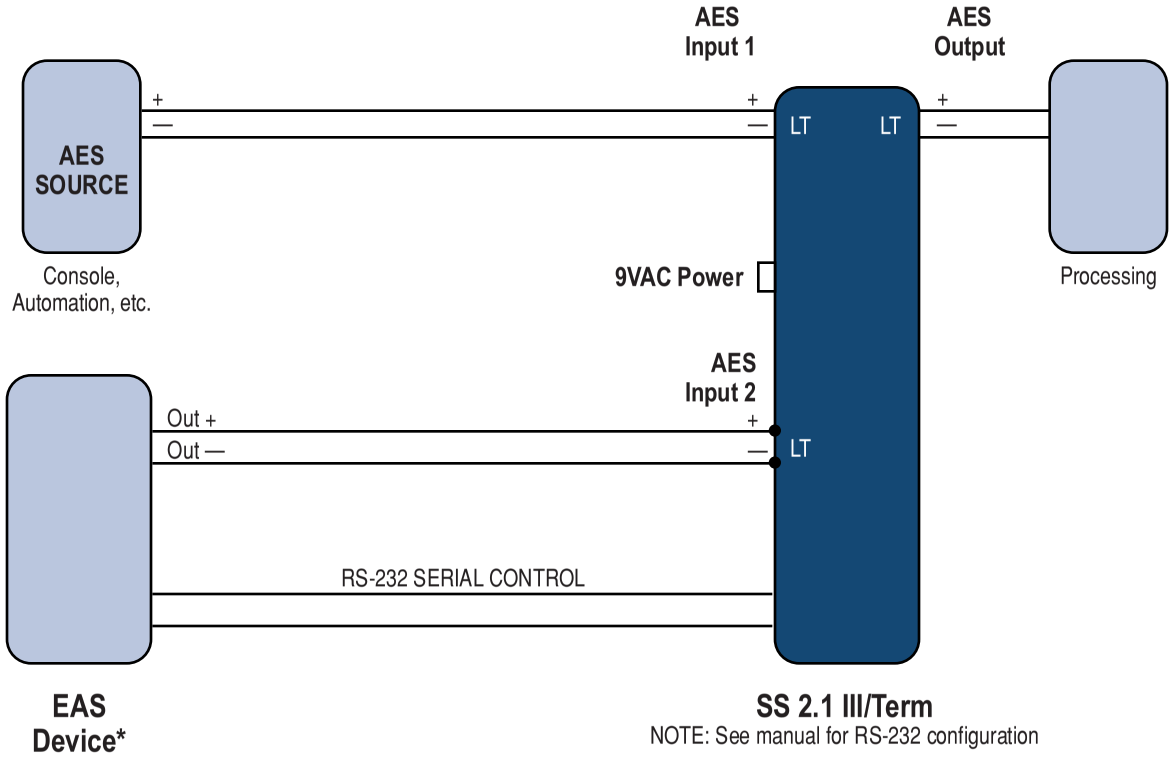
Broadcast Tools® SS2.1 III/Term
AES Audio, EAS with RS-232 Serial Control

Installation Application



* EAS units with a analog only output. The ADC-1 may be inserted between the analog EAS output and the AES Input 2.

SS 2.1 III/Term

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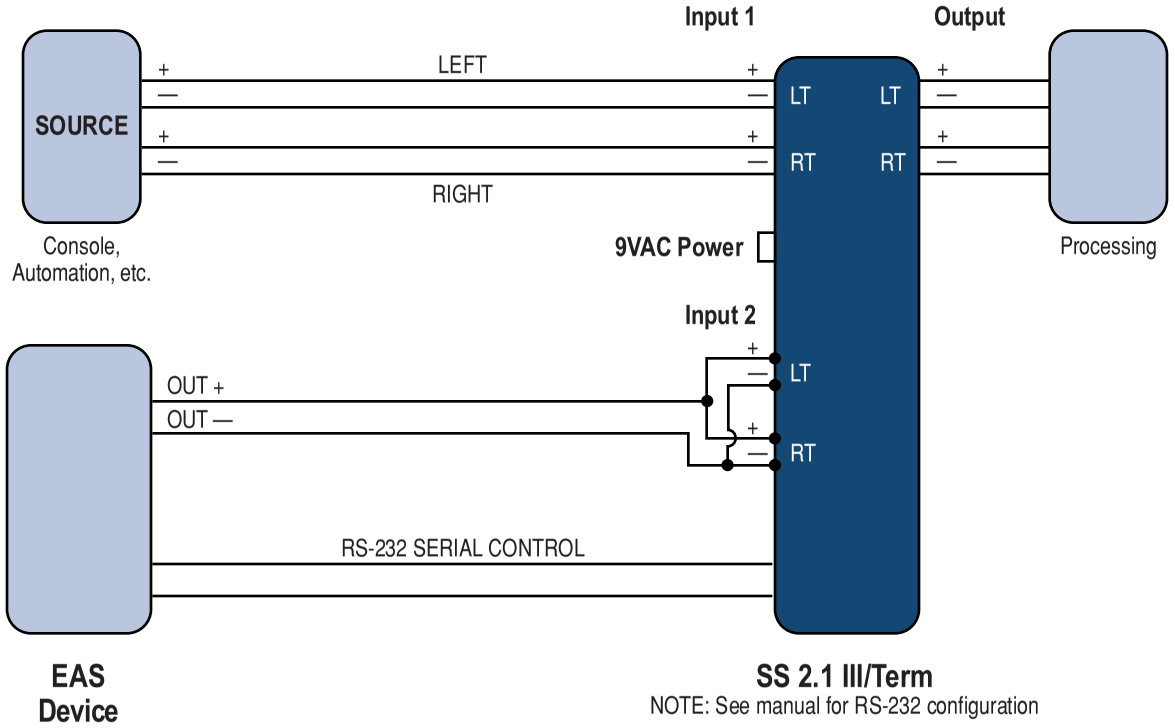
Analog Audio, EAS with RS-232 Serial Control

Installation Application



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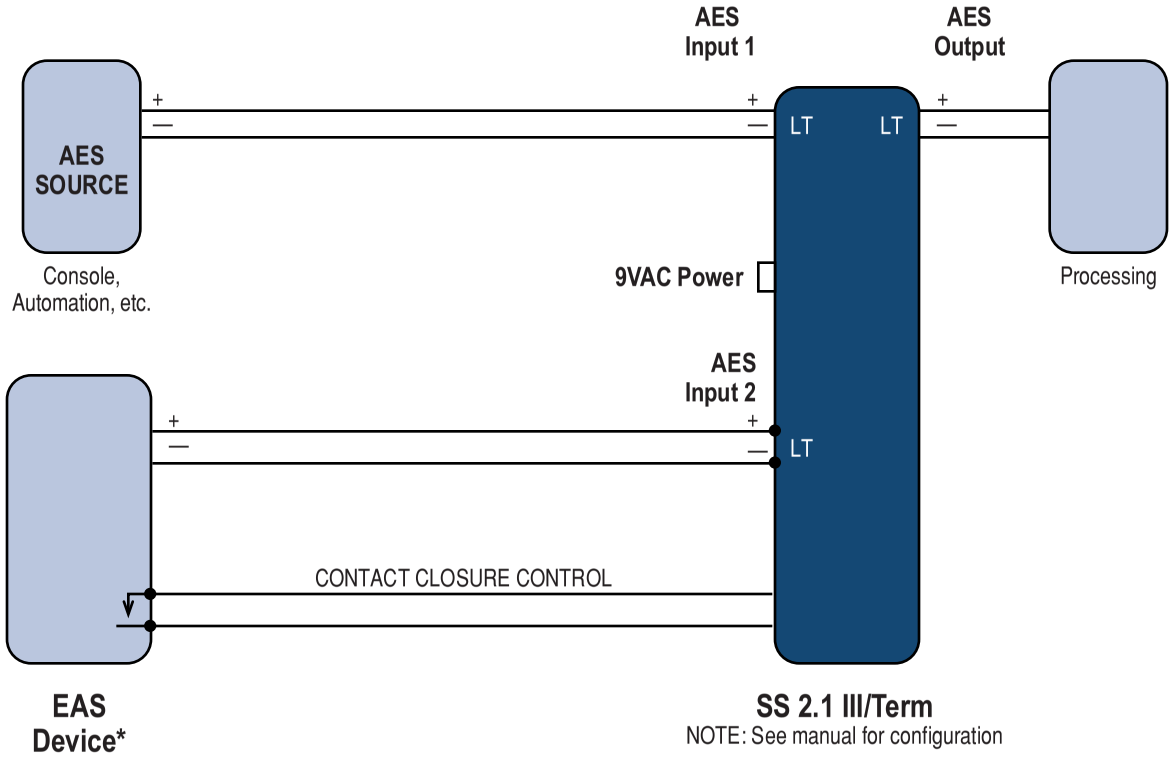
Broadcast Tools® SS2.1 III/Term
AES Audio, EAS with Contact Closure Control

Installation Application



* EAS units with a analog only output. The ADC-1 may be inserted between the analog EAS output and the AES Input 2.

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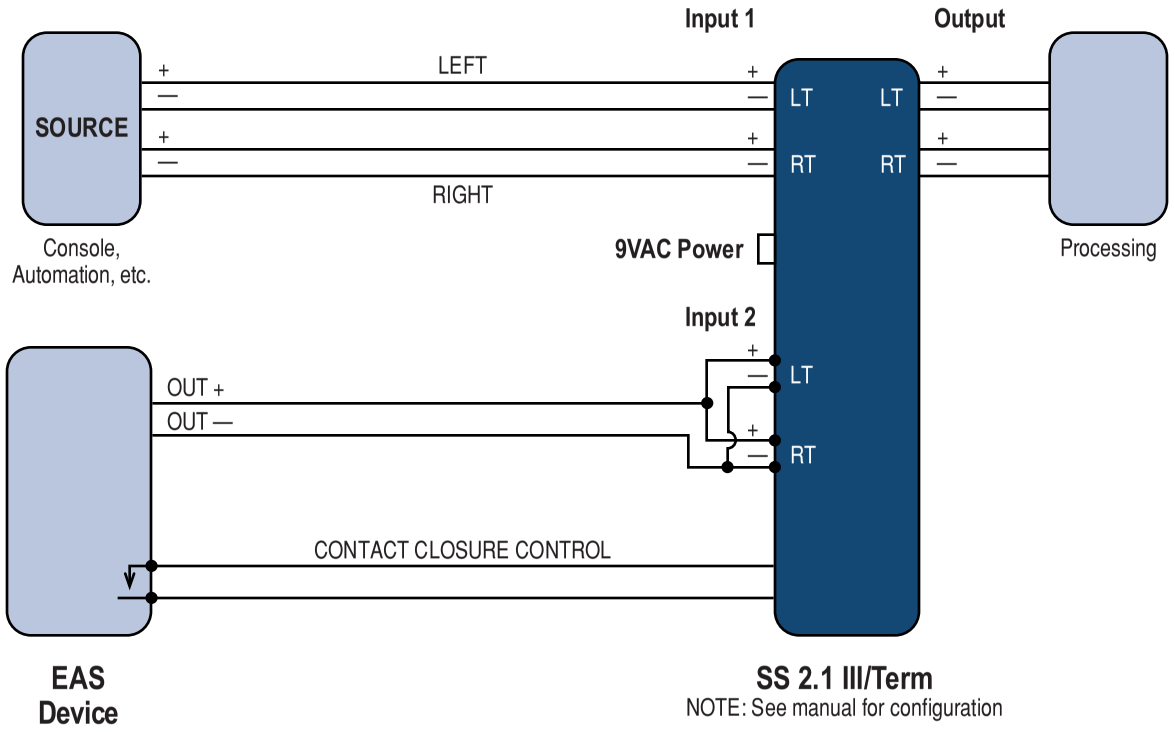

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